



Research Paper

# **-Effects of Addie and Dick & Carey Teaching Models on Students' Academic Achievement in Motor Vehicle Mechanic Work in Technical Colleges in North - Central, Nigeria**

Dr. Ali, Awalu Maliki<sup>1</sup>

<sup>1</sup>Department of Technical Education,  
School of Vocational and Technical Education  
Kaduna State College Education Gidan Waya, Kafanchan

## **Abstract**

*This study was undertaken to determine the effects of Addie and Dick and Carey teaching models on technical college student's academic achievement in Motor Vehicle Mechanics Work. The study was carried out in North - Central, Nigeria. Two research questions and two hypotheses guided the study. The population for the study was 1011 National Technical Certificate Year Two students (NTC II) 2023/2024 session made up of 778 males and 233 females. The sample for the study was 99 drawn through purposive sampling technique. The instrument used for data collection was a 40- multiple choice objective Motor Vehicle Mechanics Work Achievement Test (MOVMEWAT). The instrument was validated by 5 experts from the department of Industrial and Technical Education, University of Nigeria, Nsukka. The Kuder Richardson 20 (K-R20) method was employed to determine the internal consistency of the instrument which yielded a coefficient of 0.82. The mean was used to analyse data relating to the research questions while the ANCOVA was employed to analyzing data relating to the test of hypotheses. The result of the study indicated among others that students taught using Dick and Carey Model performed academically higher in MVMW than their counterparts taught using the Addie instructional Model.*

**Key words:** teaching, models, academic achievement, effect, motor vehicle

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## **I. Introduction**

Motor Vehicle Mechanic Work (MVMW) is one of the trade courses offered in technical colleges in Nigeria whose component parts are arranged in modules. The components include: engine maintenance, suspension system, steering and braking system, auto-electricity, transmission and reconditioning work, major engine repair works and service station mechanics.

The aim of teaching MVMW to students at this level who are mostly young full of energy and vigor and also prone to social vices (Okorie, 2001) is to equip recipients with skills for productive engagement. The Federal Government of Nigeria (FGN, 2004) reported that the main aim of MVMW in Technical Colleges is to impart the necessary skills leading to the production of craftsmen, technicians and other skilled personnel who will be enterprising and self-reliant. Also, Olayinka (2009) asserted that motor vehicle mechanics is designed to produce competent auto mechanic craftsmen for Nigerian technological and industrial development. According to the National Board for Technical Education (NBTE) (2001), motor mechanics craftsmen are expected to test, diagnose, service and completely repair any fault on a motor vehicle according to the manufacturers' specification. It was in the light of this that the FGN emphasized the implementation of automobile technology in her educational system (FGN 2004).

Motor Vehicle Mechanics Work students are usually taught the course using conventional teaching method delivery which seems inadequate; looking at NABTEB poor results in MVMW for the past six years. NABTEB Chief Examiner's report (2010-2018) highlighted the persistent poor achievement of Motor Vehicle Mechanics work students in North – central Nigeria this leaves one in doubt about the effectiveness of the mode of teaching used by the teachers of Motor Vehicle Mechanics Work. In that region Tabotndip (2004) lamented

that abstract teaching goes on today where teachers do not use apparatus and students are not using textbooks. This teaching method can hinder the development of individual student's active and creative abilities, and students who experience only this method of learning may no longer be considered sufficient for the needs of a future educated citizenry (Zhao, 2003). Richardson (2001) stressed that teachers must react constantly to the immediate events in the classroom despite having a basic plan of instruction that determines the important components of the lesson. Incorporating the use of instructional design models in the Nigerian education system especially in MVMW could assist students to achieve better in their academic career.

MVMW trade course was introduced in to the curriculum of Technical College programme in Nigeria with the aim of equipping young people with skills for gainful employment. Unfortunately, the technical education programme does not seem to adequately achieve this objective as majority of school leavers particularly those who offered MVMW trade course roam the streets unemployed as a result of lack of adequate practical skills. Apparently, training acquired in technical colleges seems inadequate to make motor vehicle mechanic work graduates competent and self-reliant as literature revealed that students' skill performance and interest in technical courses including motor vehicle mechanic work is not satisfying. Umunadi (2009) notes that technical college graduates' skill performance in motor vehicle mechanic work is on the decline which calls for immediate attention in order to arrest the situation.

This unsatisfactory performance has been partly blamed on inadequate teaching methods adopted by technical college teachers (Yalams & Fatiku, 2007). It has been argued that the use of Dick and Carey instructional guide (DCIG) may overcome this problem when carrying out practical skills learning in motor vehicle mechanic work as literature has indicated that Dick and Carey is a promising approaches for improving skills learning (Clark, 2006). Acquiring motor vehicle mechanic skills may be enhanced by Dick and Carey instructional guide (DCIG) techniques as literature has shown that task analysis can improve skill training involving complex and difficult tasks. Even though Dick and Carey is purported to have the potential to enhance skills acquisition, it is not quite certain whether Dick and Carey may be more effective in achieving better learning outcome in motor vehicle mechanic work. Therefore, the problem of this study posed as a question is: How would the use of Dick and Carey instructional guides (DCIG) affect students' academic achievement in motor vehicle mechanic work.

The general purpose of the study was to investigate the effects of Addie and Dick and Carey teaching models on technical college student's academic achievement in Motor Vehicle Mechanics Work in North - Central, Nigeria. Specifically, the study sought to determine the:

1. Effect of Dick & Carey and Addie models on student's achievement in Motor Vehicle Mechanics Work in Technical Colleges.
2. Mean achievement scores of male and female Motor Vehicle Mechanics work students taught using Dick & Carey model and those taught with Addie model in Technical Colleges.
- 3.

### **Research Questions**

The following research questions guided the study:

1. What is the effect of Dick & Careys and Addie Models on students' academic achievement in Motor Vehicle Mechanics Work in Technical colleges?
2. What is the effect of gender on academic achievement of students taught with Dick & Carey model and those taught with Addie Model in Motor Vehicle Mechanic Work in Technical colleges?

### **Hypotheses**

The following null hypotheses were formulated and tested at 0.05 level of significance:

Ho<sub>1</sub>: There is no significant difference in the mean achievement scores of Motor Vehicle Mechanics Work students taught with Dick & Carey Model and those taught with Addie model in Technical Colleges.

Ho<sub>2</sub>: There is no significant difference in the mean achievement scores of male and female Motor Vehicle Mechanics Work students taught with Dick & Carey Model and those taught with Addie model in Technical colleges.

## **II. Material and Methods**

### **Design of the Study**

The design of this study is a quasi-experimental design. It is a quasi-experimental design because the two treatment groups were randomly assigned to two intact classes. The use of intact classes was to avoid disrupting normal class activities in the schools involved in the study. The model design was represented thus:

Group 1: O    X<sub>1</sub>    O<sub>1</sub>    O<sub>2</sub>

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Group 2: O    X<sub>2</sub>    O<sub>1</sub>    O<sub>2</sub>

Where:

O = Pretest observations

X<sub>1</sub> = Treatment 1 using Dick & Carey Model

X<sub>2</sub> = Treatment 2 using Addie model

O<sub>1</sub> = Posttest observations

O<sub>2</sub> = Retention test

= Non-equivalent of the two groups

### **Area of the Study**

The study was conducted in North – central states of Nigeria. North – central was chosen because it has industries and commercial centers which need the services of well-trained Motor Vehicle Mechanic Works craftsmen and master craftsmen. North - central State has 14 Technical Colleges offering Motor Vehicle Mechanic Works whose students were used for the study to ensure that all the students in both Addie and Dick and Carey models share a common environment. Only two technical colleges were considered out of the 14 Technical colleges, because they are the technical colleges that offer Motor Vehicle Mechanic Works trades with adequate Motor Vehicle Mechanic Works facilities and well experienced teachers and they are: Federal Government Science Technical College Shiroro Kuta in Niger State and Government Technical College, Makurdi, Benue State.

### **Population for the Study**

The population for the study was 1011 National Technical Certificate Year Two students (NTC II) 2023/2024 session (consisting of 778 males and 233 females) offering Motor Vehicle Mechanics Works in all the 14 Technical Colleges in North central States Nigeria. The data were obtained from the Principals' Offices of all the Technical Colleges. The reason for choosing NTC II student's class is that the students have been taught core areas of Motor Vehicle Mechanic Work and necessary skills on Motor Vehicle Engine and fuel systems.

### **Sample and Sampling Technique**

The sample size for the study was 99 Motor Vehicle Mechanic Work second year students which comprised 72 males and 27 females from two technical colleges sampled for the study. The two Technical Colleges from the list of fourteen technical colleges in the North - Central States were purposively sampled because they are the technical colleges that offer Motor Vehicle Mechanic work trades with adequate Motor Vehicle Mechanic Works facilities and well experienced teachers. One technical college was selected from Niger State, Minna while another was chosen from Benue State. This eliminated to some extent interference in the experiment because all the students in the technical colleges are Boarding students. Each technical college has one intact class for Motor Vehicle Mechanic Work students and each intact class comprised males and females' students. One intact class was assigned as Dick and Carey Model (DCM) while the other one was assigned as Addie Model (AD) groups.

### **Instrument for Data Collection**

The instrument used for collection of data for the study was the Motor Vehicle Mechanics Work Achievement Test (MOVMEWAT). The Motor Vehicle Mechanic Work Achievement Test (MOVMEWAT) was used for both pre-test and post-test to determine student's achievement in Motor Vehicle Mechanic Work trade. The instrument was a 40-items multiple choice test adopted by the researcher from NABTEB past questions. Each objective question had 4 options A, B, C, D. The questions were answered by the subjects in one hour. The items of the instrument were carefully selected to cover all the contents tested during the period of treatment. The marking generated for the test items had each question attracting one mark. Hence, the total marks obtainable was 40 mark.

### **Validation of the Instrument**

The Motor Vehicle Mechanic Works Achievement Test (MOVMEWAT), marking scheme, Motor Vehicle Mechanics Work instructions and lesson plan scripts of Addie and Dick & Carey Models were made available to experts to ascertain the appropriateness of the instrument developed. These were lecturers from the Department of Industrial and Technical Education, University of Nigeria, Nsukka (UNN). The experts were specifically requested to check the instrument for clarity, appropriateness and suitability of the instrument to the purpose and research questions of the study. Modifications were made on the instrument, Motor Vehicle Mechanics Work instructions and lesson plan scripts of Addie and Dick & Carey Models based on suggestions of the experts.

### **Reliability of the Instruments**

The Kuder Richardson 20 (K-R20) method was employed to determine the internal consistency of the instrument. The Motor Vehicle Mechanics Work Achievement Test (MOVMEWAT) was administered on equivalent sample of Motor Vehicle Mechanic Works second year students of Government Technical college okene in kogi state not chosen for the study. The objectives answer sheets were marked by the researcher and scores kept. After two weeks, the MOVMEWAT was re-administered on the same students of Government Technical College Okene in Kogi State. The objectives answer sheets were also marked by the researcher and the scores obtained in the first and second administrations of the tests were correlated. The reliability coefficient of the MOVMEWAT was found to be 0.82.

### **Experimental Procedure**

The researcher briefed the two teachers who served as research assistants. This study involved two groups of subjects which were the Dick & Carey Model group (Experimental group 1) and the Addie model group (Experimental group 2). To ensure adherence to these two instructional design models, detailed lesson plans were developed following each procedure for the use by the teachers handling the two groups. The teacher that used Dick and Carey Model Lesson Plans was given detailed explanation on the use of Dick & Carey Model approach while another teacher that used Addie model lesson plans was also given detailed explanation on the application of the Addie model Lesson Plans. At the end of the briefing a micro teaching session was organized to ensure that the teachers have mastered the application of the lesson plans and also understood the general requirement of the research.

### **Pre-test**

This study involved two groups of subjects which are the Experimental group 1 (Dick and Carey Model group) and the Experimental group 2 (Addie model group). On the first day of the experiment, the two groups (experimental groups) were subjected to the MOVMEWAT as pre-test to all the students in the sampled schools.

### **Treatment**

The treatment for all the two groups lasted for eight weeks. The Experimental group 1 (Dick and Carey Model group) was assigned to Federal and Science Technical College, (FGSTC) SHIRORO - KUTA and the Experimental group 2 (Addie model group) was assigned to Government Technical College, (GTC) Makurdi. The research assistants conducted the experiments and also administered the measurement instruments (treatment instruments) to the students while the researcher monitored their activities. A total of 16 lesson periods were used, and each lesson period lasted for 40 minutes.

### **Post Test**

At the end of the lesson, the post test was administered on the students. The teachers helped in distributing the instrument and answer sheets to the students. They also supervised the students and collected the answer sheets at the end of the test. The researcher marked and recorded the scores.

### **Control of Extraneous Variables**

The following steps were taken in order to control extraneous variables that may pose a threat to the study:

**1.Guiding of the Participating Teachers:** The researcher explained the models to the participating teachers and guided them on how to use the models and administer the instruments. This enabled the teachers to uniformly implement the experiment.

**2.Experimental Bias:** To avoid experimental bias, the regular class teachers in the participating schools taught their own students in the two experimental groups. The researcher, therefore, personally was not involved in administering the research material. All the groups were located in different schools and LGA to avoid interaction among the subjects in the two experimental groups during the study.

**3. Treatment Bias:** Students in both groups (Dick and Carey Model group) and (Addie model group) were not informed or made to understand anything about the research process so that students can exhibit their natural behaviors during the experiment without bringing any bias. In addition, the tests question papers were withdrawn from the students and teachers immediately after the pre-test to avoid students becoming test wise (be sensitive to the test items).

**4. Subject Interaction:** The researcher did not select treatment groups from the same school to ensure that the students in the two experimental groups did not mix-up at all. This reason was to reduce the error that might arise from interaction and exchange of ideas.

**Method of Data Collection**

Students' scores in the first administration of Motor Vehicle Works Academic Achievement (MOVMEWAT) served as the pre-test scores of the study. After eight weeks of teaching, the test items were rearranged and re-administered on the students as post-test. The scores obtained from second administration served as post-test scores for the study.

**Method of Data Analysis**

The data collected from the pretest and posttest were analyzed using mean to answer the research questions. The pretest- posttest mean gains of each of the experimental groups were compared to determine the group that achieved better. The hypotheses were tested using Analysis of Covariance (ANCOVA) at 0.05 level of significance. For decision taking on the hypotheses tested, if the calculated F-value of the items is equal or less than the critical (table) F-value, the hypothesis was accepted. If otherwise, the hypothesis was rejected.

**III. Results**

Results of the study were presented according to research questions and hypotheses

**Research Question One**

What is the effect of Dick & Careys and Addie Models on students' academic achievement in Motor Vehicle Mechanics Work in Technical colleges?

Data for answering research question 1 are presented in Table 1

**Table 1:** Mean and Standard Deviation of Pretest and Posttest Scores of the Experimental Groups in Motor Vehicle Mechanics Work Academic Achievement Test

Group	N	Pretest means $\bar{X}$	SD <sub>1</sub>	Posttest mean $\bar{X}$	SD <sub>2</sub>	Mean Gain
Experimental Group 1 (Dick and Carey Model)	42	23.83	0.93	72.07	1.17	48.24
Experimental Group 2 (Addie instructional Model)	37	22.95	1.01	70.24	1.36	47.29

N = No of student    SD<sub>1</sub> =Standard Deviation for the pretest    SD<sub>2</sub> = Standard Deviation for post-test

The data presented in Table 1 show that the experimental group 1 had a mean score of 23.83 and standard deviation of 0.93 in the pre-test and a mean score of 72.07 and standard deviation of 1.17 in the post-test with a mean gain of 48.24. The experimental group 2 had a mean score of 22.95 and standard deviation of 1.01 in the pre-test and a post-test mean of 70.24 and standard deviation of 1.36 with a mean gain of 47.29. With this result, the students in the experimental group 1 taught Motor Vehicle Mechanics Works (MVMW) with Dick and Carey model improved more than experimental group 2 taught with Addie instructional Models. Hence, Dick and Carey Model is more effective than the Addie instructional Models on students' academic achievement in MVMW.

**Research Question Two**

What is the effect of gender on students' academic achievement of those students taught with Dick & Carey model and those taught with Addie Model in Motor Vehicle Mechanic Work in Technical colleges?

Data for answering research question 2 are presented in Table 2

**Table 2:** Mean of Pretest and Posttest Scores of Male and Female Students on Motor Vehicle Mechanics Work Academic Achievement Test

Gender	EG <sub>1</sub> (Dick and Carey Model)				EG <sub>2</sub> (Addie instructional Models)			
	N	Pretest $\bar{X}$	Post-test $\bar{X}$	Mean Gain $\bar{X}$	N	Pretest $\bar{X}$	Posttest $\bar{X}$	Mean Gain $\bar{X}$
Male	38	23.43	72.86	49.43	34	23.27	72.57	48.30
Female	4	23.39	71.31	47.92	3	22.71	68.91	46.20

N = No of student     $\bar{X}$  = Mean    EG<sub>1,2</sub> = Experimental Group 1 and 2

The data presented in Table 2 revealed that male students in the experimental group 1 taught Motor Vehicle Mechanic Work (MVMW) had a pre-test mean achievement score of 23.43 and a post-test mean achievement score of 72.86, resulting to a mean gain of 49.43, while their female counterparts had a pre-test mean achievement score of 23.39 and a post-test mean achievement score of 71.31, resulting to a mean gain of 47.92. Also, male students in the experimental group 2 had a pre-test mean achievement score of 23.27 and a

post-test mean achievement score of 72.57, resulting to a mean gain of 48.30, while their female counterparts had a pre-test mean achievement score of 22.71 and a post-test mean achievement score of 68.91, resulting to a mean gain of 46.20. With this result, male and female students in the experimental group 1 taught MVMW with Dick and Carey model improved more than male and female students in experimental group 2 taught with Addie instructional Models. This result also shows that the male students performed better than females. This could be an indicator of the existence of a gender factor that has an effect on the achievement of students in MVMW.

### Test of Hypotheses

#### Hypothesis One

There is no significant difference in the mean achievement scores of Motor Vehicle Mechanics Work students taught with Dick & Carey Model and those taught with Addie model in Technical Colleges.

The data for the test of  $H_{01}$  was analysed and presented in Table 3

**Table 3:** Summary of Analysis of Covariance (ANCOVA) for Test of Significance of Effect of Treatment on Students' Achievement Test in Motor Vehicle Mechanic Work

Source	Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	274.023 <sup>a</sup>	2	137.012	9.963	.000
Intercept	186.098	1	186.098	13.532	.000
Pre-test	258.533	1	258.533	.518	.474
Treatment	7.125	1	7.125	18.799	.000
Error	1045.192	76	13.753		
Total	44642.000	79			
Corrected Total	1319.215	78			

**\*Significant at  $P \leq .05$**

The data presented in Table 3 shows F-calculated values for mean scores of experimental groups in Motor Vehicle Motor Work achievement test. The F-calculated value for group is 18.799 with a significance of F at .000 which is less than .05 ( $p < 0.05$ ). Hence, the null hypothesis of no significant difference in the mean achievement scores of Motor Vehicle Mechanics Work students taught using Dick and Carey model and those taught with Addie instructional Models is therefore rejected at .05 level of significance. With this result, there is significance between the mean achievement scores of students taught Motor Vehicle Mechanic Work with Dick and Carey Model and those taught with Addie instructional Models.

#### Hypothesis Two

There is no significant difference in the mean achievement scores of male and female Motor Vehicle Mechanics Work students taught with Dick & Carey Model and those taught with Addie model in Technical colleges.

The data for the test of  $H_{02}$  was analysed and presented in Table 4

**Table 4:** Summary of Analysis of Covariance (ANCOVA) for Test of Significance of Effect of Gender on Students' Achievement Scores in Motor Vehicle Mechanic Work

Source	Sum of Squares	Df	Mean	Square	F	Sig.
Corrected Model	282.053 <sup>a</sup>	4	70.513	5.031	.001	
Intercept	185.425	1	185.425	13.230	.001	
Pre-test	265.215	1	265.215	18.923	.000	
Treatment	6.789	1	6.789	.484	.489	
Gender	5.126	1	5.126	.366	.000	
Error	1037.163	74	14.016			
Total	44642.000	79				
Corrected Total	1319.215	78				

**\*Significant at  $P \leq .05$**

Table 4 reveals that the F-calculated value for group is .366 with a significance of F at .000 which is less than .05 ( $p=0.010$ ,  $p<0.05$ ). The null-hypothesis was therefore rejected at .05 level of significance. With this result, there is a significant mean difference between the effect of gender on academic achievement of student taught Motor Vehicle Mechanic Work with Dick and Carey Model and those taught with Addie instructional Models.

## IV. Discussion of Findings

Data presented in Table 1 shows that the students in the experimental group 1 taught Motor Vehicle Mechanics Work (MVMW) with Dick and Carey model improved more than experimental group 2 taught with Addie instructional Models. In the same vein, data for the test of  $H_{01}$  was analysed and presented in Table 7 shows F-calculated values for mean scores of experimental groups in Motor Vehicle Motor Work academic

achievement test value for group is 18.799 with a significance of F at .000 which is less than .05 ( $p < 0.05$ ). Hence, the null hypothesis of no significant difference in the mean achievement scores of Motor Vehicle Mechanics Work students taught with Dick and Carey model and those taught with Addie instructional Models is therefore rejected at .05 level of significance. The result revealed that, there is significance between the mean achievement scores of students taught Motor Vehicle Mechanic Work with Dick and Carey Model and those taught with Addie instructional Models. The implication is that instructional model of Dick and Carey is more effective than Addie instructional Models. The finding agreed with the finding of Bello and Aliyu (2012) who found out that there were significant differences between the mean achievement scores of the experimental and control groups in the post-test; and this was not attributed to sex of the subjects (Male or Female) unlike in the school proprietorship (Federal or State Colleges of Education) when post-tested. The finding is also in consonance with the finding of Bakare (2010) who conducted a study on the effects of reciprocal peer tutoring on academic achievement of students in electronics technology in technical colleges of Ekiti State and found that students taught with reciprocal peer tutoring scored higher in the post test than those taught with lecture method in introduction to electronic measuring instrument. This finding agreed with the finding of Igwe (2010) who found that students taught basic electronics with tutorial, drill and practice methods of computer assisted instruction had a higher mean achievement scores than those students taught using the conventional teaching method in the achievement test. The findings is also in line with the assertion of Cotton (2001) who pointed out that the use of computer based learning produces achievement effects superior to those obtained with traditional instruction. Cotton explained further that student learning rate is faster with computer-based learning than with conventional instruction.

The data presented in Table 2 revealed that male and female students in the experimental group 1 taught MVMW with Dick and Carey model improved more than male and female students in experimental group 2 taught with Addie instructional Models. In the same vein the data for the test of  $H_0_2$  was analysed and presented in Table 8 the F-calculated value for group is .366 with a significance of F at .000 which is less than .05 ( $p=0.010$ ,  $p<0.05$ ). The null-hypothesis was therefore rejected at .05 level of significance. The result revealed that, there is a significant mean difference between the effect of gender on academic achievement of student taught Motor Vehicle Mechanic Work with Dick and Carey Model and those taught with Addie instructional Models. This result also showed that the male students performed better than females. This could be an indicator of the existence of a gender factor that has an effect on the academic achievement of students in MVMW. It has been established that the learner's own feeling toward the subject matter will largely determine how much of the material will be learned and how thoroughly it will be learned. This finding is in concordance with Aninweze (2014) which found out that Video Tape Instruction (VTI) had a significant effect on students' academic achievement and retention in Biology. Gender was a significant factor in students' academic achievement as the male students achieved higher than the female students. Gender also has a significant effect on student retention as the male students retained higher in total mean retention scores but females retained better when taught using VTI. The result showed that VTI was more effective in enhancing students' achievement and retention in Biology in Senior Secondary Schools.

## **V. Conclusion, Educational Implications of the Study and Recommendations**

The need for appropriate and adequate learning outcomes at all educational levels is crucial in this contemporary world more than ever before. Educators are often tasked with developing courses and curricula that teach learners how to perform certain procedures by given instructions to learners. This instruction must be designed to provide an optimal, uniform learning experience for all learners. Instructions are often structured or modeled to present the abstract knowledge to learners. The use of model in teaching is usually discipline-specific as representation of a reality to learners. This study found out that students taught Motor Vehicle Mechanics Work with Dick and Carey Model had a higher mean achievement score than those taught with Addie instructional Models. The mean difference was found to be significant. The study here was an effect of academic achievement of Motor Vehicle Mechanics Work students taught with Dick and Carey Model and those taught with Addie instructional Models. The gender effect was found to be significant which favors the males in both models than females. These results therefore showed that instructional design model is more supportive in teaching technique to technical college students.

Findings of this study have implications for Motor Vehicle Mechanics Work teachers, Motor Vehicle Mechanics Work students, NABTEB and the society at large. Having found out that use of instructional design model improves students' academic achievement, especially Dick and Carey Model which is more effective for improving students' achievement, and retention in Motor Vehicle Mechanic Works, there is need for technical teachers to adopt the use of instructional design model in teaching technical college students. There is need for teachers to seek knowledge of instructional design model to enhance their teaching methodology which will in turn lead to improved performance of students in MVMW. Motor Vehicle Mechanics Work teachers can use instructional design model to achieve learning objectives

Moreover, one of the important finding from this study is effect of gender on achievement and retention of Motor Vehicle Mechanic Work favours males more than females. This finding implied that more attention for female students would be needed by the school administrators to organize extra lesson as this would go a long way to improve their achievement in MVMW.

The implication of this finding on the use of instructional design model as found to improve students' achievement and retention if adopted by NABTEB, the findings of the study will provide useful information as it will serve as a handy guide in training Motor Vehicle Mechanics works teachers during practical classes.

Based on the findings of this study, the following recommendations are made:

1. Technical teachers of Motor Vehicle Mechanics Work should adopt the use of instructional design model in teaching of Motor Vehicle Mechanics Works trade course/ subjects.
2. Technical teachers of Motor Vehicle Mechanics Work should prepare their lessons in line with instructional design model guidelines in such a way that the students are given ample opportunity to interact freely with the teachers. This will go a long way to improve their academic achievement.
3. National Board for Technical Education (NBTE) should consider review of curriculum for Motor Vehicle Mechanics Work with a view to incorporating instructional design model into the teaching of Motor Vehicle Mechanics Work trade/subject.
4. Workshops, seminars and conferences should be organized by Federal and State Ministries of Education and Administrators of Technical Colleges to enlighten technical teachers and improve their knowledge and skills on the use of instructional design model in order to utilize it for improving students' academic achievement in Motor Vehicle Mechanics Work.
5. Students should always be allowed to participate actively and interact freely with the teachers and their peers in the class as this will improve their academic achievement gain in their subjects.
6. Facilities that could encourage the use of Dick & Carey models should be provided to Motor Vehicle Mechanic Work teachers in technical colleges.
7. Teachers should encourage their students to also learn work in groups as this will enable them improve
8. Their interpersonal skill, interpersonal intelligence, social skills, and relationship skills

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